REMARKS

Claims 24-26, 36, 41 and 42 are pending in the application. Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

35 USC §103 Rejections

Claims 24-26, 36, 41 and 42 are rejected under 35 USC §103 as being unpatentable over Kotoulas et. al. U.S. Pat. No. 6,751,602 (henceforth "Kotoulas") in view of Garcia U.S. Pat. No. 5,412,985 (henceforth "Garcia"). Applicants respectfully traverse.

Independent claims 24 and 41, recite a system for determining the instantaneous amplitude (a) and phase (φ) of an analog sinusoidal signal comprising **both**:

> "…**an amplitude computation device** which receives said in-phase (1) and quadrature (Q) components and computes the instantaneous amplitude (a) of said digital sinusoidal signal by processing said in-phase (1) and quadrature (Q) components according to the equation $a = \sqrt{(Q^2 + I^2)}$; **and**

>   **a phase computation device** which receives said in-phase (I) and quadrature (Q) components and computes the instantaneous phase (φ) of said digital sinusoidal signal by processing said in-phase (I) and quadrature (Q) components according to the equation $\phi = \tan^{-1}(Q/1)$."

Kotoulas is directed to a system for adaptively controlling a vibration and noise producing plant (e.g. a helicopter engine). (See Abstract and Fig. 1.) The Kotoulas system features a processing unit 110 for processing sensed noise and vibration signals to provide suitable inputs to a neural network control unit. Processor 110 features Hilbert transform envelope detector 234, which operates to, in a highly computationally efficient manner, detect the noise signal envelope of a detected noise signal. (column 15, lines 22-30).

As recognized in the Office Action (pages 2-3), Kotoulas does not disclose, teach, or suggest that processor 110 include **a phase computation device** which receives in-phase (I) and

quadrature (Q) signal components and computes the instantaneous phase (ϕ) according to the equation $\phi = \tan^{-1}(Q/I)$, as required by claims 24 and 41. However, the Office Action alleges that, in view of Garcia, it would have been obvious to modify the processor of Kotoulas to include such a phase computation device "in order to provide proper indication of the direction of a vibrating and noise signal so as to adjust system parameter so as to counteract the effect of such vibration/noise." Applicants disagree.

If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). (See, also, MPEP §2143.01.) Applicants respectfully submit that the modification of the device of Kotoulas to include a phase computation device of the type disclosed in Garcia would render the device incapable of its intended purpose.

Kotoulas teaches that

"The digital noise signals to be controlled are highly variable and are sampled at a rate higher than the execution rate of the controller and emulator. ... To reduce the DSP processing computational requirement, the noise signals are transformed to baseband frequencies using a Hilbert Transform digital envelope detector. *The controller is then used to reduce the ... noise envelope signals <u>rather than</u> the highly variable noise signals, thus reducing the overall DSP computational requirement.*"

Thus, Kotoulas explicitly teaches detection of a noise signal envelope only, because detection of other characteristics of the signal would impose to high of a computational load to allow for proper operation of the system. Kotoulas further notes that:

"Identifying a signal envelope is conceptually like detecting an AM radio signal, but with digital data signals. The block diagram in FIG. 8 describes the Hilbert Transform envelope detector... [which]...generates the Hilbert Transform of the input noise signal (.i.e., xhat [where x is the signal]).... The noise envelope signal is then generated by taking the <u>square root of the noise power</u> obtained by summing the power of the Hilbert transformed signal and the original delayed signal (i.e., sqrt(x^2+xhat^2))."

Accordingly, the noise envelope detection can be successfully accomplished using only an amplitude computation. The proposed addition of a phase computation of the type disclosed in Garcia would therefore impose an unnecessary increase in the computational load, running counter to the Kotoulas explicit teaching that the signal processing computational requirement be reduced (column 15, line 26).

Further, because only a _noise envelope amplitude_ is detected and reduced by the control system, there would be no benefit to performing a phase calculation to "provide proper indication of the direction of a vibrating and noise signal" as suggested in the Office Action. To the contrary, Kotoulas explicitly teaches (column 15, lines 36-39) that multiple noise sensor signals be processed through Hilbert transform envelope detector 234, and that the resulting noise envelope signals simply be summed *without regard to direction*. This again clearly indicates that the addition of a phase computation element to the Kotoulas device would be superfluous and an unnecessary increase in computational load.

In view of the above, Applicants submit that the proposed combination of Kotoulas and Garcia would not have been obvious to a person skilled in the art, and therefore improper. Accordingly, there is no proper basis for the rejection of independent claim 24 and 41. Claims 25-26 depend from claim 24, and therefore are patentable for at least the same reasons. Claims 36 and 42 are method analogues to apparatus claims 24 and 41, and thus are also patentable in view of the above arguments. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of all pending claims under 35 USC §103.

Conclusion

Applicants believe that there is no proper basis for the rejections under 35 USC 103, and that the present application is now in condition for allowance. Favorable reconsideration of the application is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date ___*Nov. 2 6, 2008*___   By _____

FOLEY & LARDNER LLP
Customer Number: 48329
Telephone: (617) 342-4093
Facsimile: (617) 342-4001

Ralph Trementozzi
Attorney for Applicant
Registration No. 55,686